# NAKIVALE REFUGEES SETTLEMENT

## FINAL REPORT

## ENVIRONMENT & LIVELIHOODS

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## 1.0 INTRODUCTION

This report is based on the field observations, discussions with IPs and staff in the field. It provides key messages for mainstreaming not only environmental concerns, but also exploring alternative sources of energy and the emerging livelihood opportunities. The presentation is divided into three main strategic objectives following here below:

Nakivale settlement has served and accommodated refugees as a settlement area since the late 1950s. It is currently hosting over 60,000 refugees with close to 10 nationalities present in the settlement. There are considerable areas that are highly agriculturally productive, growing crops such as maize, sorghum, finger-millet, potatoes, groundnuts, beans and various types of vegetables.

The refugees don't rare livestock but the nationals living around the settlement do keep some livestock. At the moment Nsamisi is promoting small livestock stock rearing such as goats, chicken and ducks (see discussions later in livelihoods opportunities section of this text). Lake Nakivale is providing a livelihood for both nationals and refugees living around it.

The settlement's layout is categorized in three distinct sections: The first section of settlement is settled solely by the refugees and not allowed to grow permanent crops such as bananas though a few have done so and their crops look fairly good; the second section is actually an interface of both refugees and nationals as encroachers or for some unclear reasons; while last section which is outside the settlement is purely occupied by the nationals.

Typically Better-off 9% (5,400): Much less dependent on food and other rations; own motor vehicles; own average 60 cattle; cultivate 50x100 meters; hire labour for farm work; may require less targeting with aid supplies.

Moderate 30% (18,000): Less dependency on food and other rations; hire labour; cultivate crops; hire labour for farm and marketing the produce.

Poor 46% (27,600): Largely dependent on food and other rations; provide labour to the better off and moderate households; sometimes barter food and other rations to buy other essentials.

Very Poor 15% (9,000): Highly dependent on food and other rations; these are the relatively most vulnerable such as the elderly, disable, minors, orphans windows and those with ill health.

## 2.0 OVERALL SUMMARY DISCUSSIONS & RECOMMENDATIONS

1) The assessment and indeed the proposed practices and guidelines are in line with "The National Environment (Minimum Standards for the Management of Soil Quality) Regulations, 2001", which emphasizes the need to have minimum standards to ensure land productivity.

2) Key stakeholders include: The UN Agencies; INGOs /NNGOs; Government –OPM; Forestry department; Environment department; NEMA; Agriculture department; Local authority and Refugee community

3) It was estimated that the current forest density /carrying capacity and the general conditions of the vegetation cover within the 3-5 kilometers radius is reduced by about 55% for the small to medium types of trees and 45% of the big trees which a significant reduction. The nationals and the refugees are cutting the big and small trees for making charcoal and fire wood purposes.

4) The Forestry department and OPM to plan how to establish tree plantations in the hills and mountainous areas -public lands, while the IPs concentrate of supporting plantations within the farm lands of the refugees; apparently, most of these hills and mountainous areas nearly almost bare without proper vegetation cover, a concern that needs to be addressed at least by ensuring effective a forestation programme.

*A) Water catchment/water shed management*

5) Minimize the problem soil erosion that is being caused by running water along the hills and mountainous areas for example, by digging Cut –off drain and planting trees such as Eucalyptus trees; Cypress; Gravella robusta trees; Pine pucinatuum; Neem tree; Fruit trees of different types in the settlement.

6) Promote institutional based environmental practices i.e. the establishments of woodlots and fruit trees in schools, churches and /or health centers as an alternative approach to a forestation due to care and management challenges. The experience has shown that the survival rate of trees plated is high in such institutions, for example, in Kalurindi primary school in Isingiro district, 326 out of 421 fruit trees (77%) planted survived.

7) It is also necessary to promote fruit trees (orchard) at household level due to their economic and nutrition benefits, mainly because households are more likely to care for fruit trees because of their value than other trees and than those trees planted in public land.

8) Increase the number of seedlings being given to households from 1-2 to 10 tree seedlings, households are reportedly in need of more tree seedlings for planting at household level in the settlement. Need for more funds, while the current target is to reach 2000 hhs with at least 4 seedlings per household.

*B) Wetlands management practices*

9) Refill back soil in places where soil has been dug for making building blocks so as to avoid: increasing soil erosion caused by running water; breeding areas for mosquitoes during the rains; also avoid pits that may threaten safety of pedestrians especially children in the area.

10) Ensure 200 meter distance away from the shores of the lake or any water body, are not cultivated as a standard requirement to prevent soil erosion and siltation at and around the shores of the lake, this practice has not been observed but need to be enforced accordingly.

11) It is important to plant trees at 50 meter distance, so that the roots of the trees /woodlot established will help to strengthen the existing soil structure along the river beds or shores of the lake to reduce the rate of erosion and siltation.

12) The eucalyptus tree species, for example, should not be planted near the wetlands mainly because it consumes a lot of water. One big eucalyptus tree consumes about 40,000 gallons of water a year, so it is not suitable for planting in the wetlands which are expected to be water reservoirs.

13) Organize competitions and awards among schools and clubs to help sensitize and motivate communities in the sections different sections of the settlement.

14) Establish environmental focal point/committee (5-7 people per section) to enhance communications and dissemination of information in helping to raise awareness and to monitor environmental concerns.

15) The attack by the termites (insects) has considerable effect on the survival rate of the trees planted in the settlement; so apply pesticides /chemicals in the holes/soil before planting and /or after planting apply at the base of the tree planted in order to control the pests.

16) Raise awareness on the use of organic and traditional products such as Ash (a handful of ash per plant) or formulations of neem tree mixed (ration 3:1) with some small quantities of washing/detergent to make it be more sticky for the purposes of controlling the termites/insects;

*C. ) Alternative Livelihoods*

17) The following types of livelihoods need to be promoted and scaled up to complement livelihood systems of refugees for income and to help minimize high dependency on forestry resources; their success rate was observed likely in the settlement: these Goats/sheep; Chicken; Ducks; Pigs; Bee keeping; Grain storage and marketing (see details in the main text).

18) It will be useful to conduct exchange visits within the camp, there are some pigs kept by individuals to share experience and learn from; conduct exchange programme visit to other settlements like Ramwanja etc

19) Increase the provision of basic knowledge and skills through training and hands-on small stock management practices i.e feeding, shelter, and disease control etc. including cost benefit analysis of each enterprise.

20) Raise awareness on Sustainable agriculture that can also involve systems and practices of integrating perennials trees with crops and/or animals (agro forestry) on the same land management unit - 50x100 meters per household (see details in the main text). So far 3 day training has been offered on modern agriculture techniques; Nsamizi targeting two zones with 6 extension staff while ARC 1 zone with two extension staff all together targeting directly 3000 households.

*D) Alternative energy sources Vs waste management*

21) The following farm and household wastes are available and can be recycled for compost manure and/or for energy; for example, recycling waste paper as that of "Makapad" production: Maize cobs; Sorghum husks; Finger millet husks; Banana pearls; Irish potatoes pearls; Beans husks; Cassava peels; Groundnut husks; Any farm produce wastes; Any kitchen waste but not plastics types of materials.

22) Follow up to assess the performance/adoption of mud stoves and challenges households face with about 3,874stoves/ Rocket Lorena distributed since 2009 and those 1,080 SAVE 80 Stoves reportedly donated by a Japanese company, some of which refugees reportedly sold to the nationals. There is need to provide axes for cutting wood materials into small pieces suitable for firewood.

23) Increase the number of Rotary compressor from 1-3 , which will cost about 4.5 million UGS for making briquettes, one machine is available and currently shared between Robondo and Juru Community Centres used by 4 groups for training; it costs about 1.5 million Uganda Shillings.

24) Scale up the manual system of production locally building on successful initiatives started by Nsamizi, whereby a group produced 7,000 pieces of charcoal briquettes distributed to its members to use; these are reused and last 4 months. 1Kgs of briquettes is valued at 200UG shillings.

25) Increase raising awareness and to re-enforce law through the involvement of local administration/ authorities to ensure proper use and protection of resources.

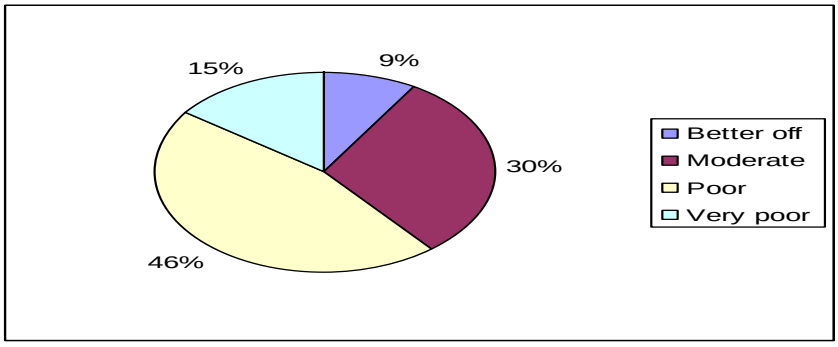
## 3.0 MAIN FINDINGS, DISCUSSSIONS & GUIDELINES

The overall objective is to review the ongoing activities on environment and outline the principles, methods and practices that are more likely to improve mainstreaming and strengthen the management of natural resources:

a) Water-shed/catchments and Wet-lands management practices
b) Farmland management practices and potential livelihoods opportunities
c) Waste management practices and alternative sources of energy

The Office of the Prime Minister (OPM) is in charge of environmental activities in the settlement; apparently having very limited activities due to inadequate resources available that need to be addressed. The environment is currently not considered as a fully fledged sector but integrated with livelihood activities. This, in an ideal situation would involve having a national staff dedicated to environmental activities, to help focus its concerns; meanwhile, despite the lack of a fully dedicated staff for the environment sector, IPs can still mainstream considerable activities within the existing IPs current budgets and staffing as a start.

There are no environment management committees or focal points presently in the settlement that would help steer activities at sections levels. The national residents are involved in the programmes and are also receiving tree seedlings. It is expected that, and depending on the needs, when resources are available the residents should benefit about 20-30% of the refugees programme.




This estimation is based on the observations/ perception of the available resources and lifestyle.
Typically Better-off 9% (5,400): Much less dependent on food and other rations; own motor vehicles; own average 60 cattle; cultivate 50x100 meters; hire labour for farm work.

Moderate 30% (18,000): Less dependency on food and other rations; hire labour; cultivate crops; hire labour for farm and marketing the produce.

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**Water-Shed/Catchments and Wet-lands Management Practices,**

The aim of this section is to highlight the ongoing Water-shed/catchments management practices, and outline the principles, practices and activities for the improvements of the *watersheds a*nd at the same time consider other livelihood opportunities while protecting and their functions as the main sources for water.

The present forestry density/ carrying capacity and general vegetation cover situation within the 3-5 kilometres radius is estimated at 55 % for the small to medium types of trees and 45% of the big trees; other common uses of the available resources to attain livelihoods in the settlement include but not limited to the following:

- Land/soil to use for producing food and rearing livestock etc
- Harvesting firewood and charcoal for energy/fuel for households
- Collecting water for domestic use, building and farming purposes,
- Using wood resources for shelter and other constructions;
- Soil excavations for molding blocks and constructions
- Gravel excavations for constructions purposes and so on

*Water catchments/watershed practices*

The Water-catchments /water-shed areas or basins are those aspects of lands which are surrounded by natural features such as hills or mountains from which all runoff water flows through to downstream areas, without which it would be difficult get rainfall/precipitation.

- The water from either the hills or mountainous areas is flowing to a low point of the land into a dam, a location on a river, the mouth of a river or the lake.

- The hills/mountain areas form essential aspects of the landscape as the main sources of water resources so it is vital to maintain their biodiversity through protection and conservation as well as a forestation programme.

- If and when the water-sheds or catchment are not properly maintained in terms of ensuring vegetative cover /a forestation and the speed of the water flow is not checked accordingly, the downstream areas, respectively, risk getting damaged as a result of increased erosion or risk having sufficient access to water resources for communities.

- If and when the watershed areas- hills and mountains are covered by forest/vegetation, they will have the ability geographically to attract the formation of rainfall /precipitation amounts and patterns.

- It was observed that most of the hills and mountainous areas are nearly almost bare without proper and sufficient vegetation cover and this is a concern to be addressed by ensuring a forestation programme.

- There is here-below a sample photograph of a situation likely to impact the quality of the soil/land and availability of water due to erosion problems that have been has exacerbated by lack of sufficient vegetation cover as a case in point.

Figure 1Hills and higher grounds in Nakivale that need tree planting

- It is important for the IPs and OPM to raise awareness on measures stated above as guidelines to help preserve conserve, utilize and monitor the conditions of the existing Watershed (see additional key messages below).

- It is necessary to dig a Cut –off drain (a water trench) at the breaking point of the hills, mountainous areas or raised grounds in order to reduce the speed water flowing downstream.

- In this process the cut-off drain trench dug will not only help to conserve soil and water flowing downstream but also recharge water levels more regularly downstream.

- The trench dug, is also beneficial in that, more trees including fruit trees can be planted on top of the ridge/ heap of soil dug from the trench.

- There are several different types of trees species that can be planted at the water-shed /catchment areas, consult further with the local forestry department to select species that adapt well and are recommended, consider the following species but not limited to, including fruit trees: eucalyptus trees; Cypress trees; Gravella robusta trees; Pine pucinatuum; Neem trees; and fruit trees of different types.

*Wetlands Management Practices*

The aim of this section is to highlight the ongoing Wet-lands management practices, and outline the principles; practices and activities that can help the wetlands retain their critical functions as water reservoirs and maintenance of the surrounding bio-diversity.

There are three different types of wetlands, with their distinct characteristics: Marine and coastal zone wetlands; Inland wetlands and Human made wetlands. The focus in Nakivale however will be on both Inland and human made and lake shores types of wetlands i.e. Lake Nakivale.

A wetland and its shores need to remain with its natural vegetation cover in order to maintain its resilience of biodiversity; as such, the vegetation should not be destroyed / used for any purposes, though other related types of vegetation can be introduced to boost its cover i.e. water lilies, Arrow roots, reeds/water grass etc.

There certain tree species like the eucalyptus should not be planted near the wetlands mainly because of its high level of water consumption. One eucalyptus consumes about 40,000 gallons of water a year, so it is not suitable for planting in the wetlands which are expected to be water reservoirs.

The features of Inland wetlands in Nakivale;

The Inland wetland features illustrated here-below should enhance an understanding and indeed help to identify areas of wetlands that need to be protected and managed well:

- Seasonal and irregular rivers and streams
- River- floodplains; includes river flats, flooded river basins,
- Seasonally flooded grassland,
- Permanent freshwater lakes
- Swamps and waterlogged areas
- Inland deltas (permanent) etc

A sample of woodlot established to protect a wetland:

The Woodlot is established near Lake Nakivale a few meters away from Lake (a wetland area). There are also crops planted within the proximity of the woodlot (agro-forestry trees) and currently being harvested; considerable number of trees have been damaged by termites (pests/insects) with only a few isolated number of trees surviving – see the photograph below near Lake Nakivale.

**Lake** Nakivale and Woodlot planted around the lake.

The Lake is located directly behind the woodlot in the picture and it was reported that nationals are encroaching the lake-shore (wetland zone) by growing different types of crops. It is important to ensure leaving 200 meter distance away from the shore, a minimum standard required to prevent soil erosion and siltation of the lake. The management of public woodlots of this type is challenging due to the problem of management arrangements and ownership.

The other alternative is to promote the establishment of woodlot trees at household level (see details in section 2 farmland management practices). The households are allocated 50x100 meters size plots for farming activities, though the size is likely to hinder the establishment of a comprehensive woodlot at household level, but at least some small portions of it within the compound can still be dedicated for a woodlot.

It is also important to promote fruit trees (orchard) at household level due to their economic and nutrition benefits, mainly because households are more likely to care for fruit trees because of their value than other trees and than those trees planted in public land.

**Figure 2 Sample of Citrus fruit trees**

The following are some key messages to disseminate in communities to enhance understanding important conservation practices: these are not only meant to sensitize on need to avoid cultivations close to the river banks, lake or any water body, but also to help identify the different types of tree species suitable in each setting:

- Cultivations loosen the soil and increases soil erosion.

- As a result of erosion small and fine particles of soil easily fills into (siltation) the water body /lake and slowly reduces space for water.

- It is important to plant trees at the 50 meter distance; so that the roots of the trees /woodlot established will help to strengthen the existing soil structure so as to reduce the rate breaking banks and soil erosion.

- At least 100- 200 meter distance is acceptable and can be cultivated or forested/ establish woodlot to avoid the erosion and siltation of the water body.

- Due to problem of making decisions such as when and how to maintain the trees i.e. for pruning; timing of harvesting fuel for firewood and building materials; sales and income management, it is recommended to promote and actually scale up institutional woodlots such as schools, health units and churches as well as households. These institutions are more likely to care for the trees than those planted in other public lands which make it difficult to take responsibility.

- In Kalurindi primary school, for example, 326 out of 421 fruit trees planted survived – mangoes, pawpaw; problem reported was that during the holidays when schools are closed the nationals uprooted some fruit trees; something that schools authorities can to address with local leadership and communities living around schools.

- It is necessary appoint or select environmental focal point/committee (5-7 people per section) to enhance receiving and giving feedback to and fro the refugee community, help raise awareness and monitor environmental concerns.

A sample of digging soils for building
The following are the features of Human-made wetlands; Water storage areas; reservoirs; Ponds; including farm ponds; Excavations; gravel pits, soil pits; Seasonally flooded arable land, farm land

Figure 3 Excavating Soil for Moulding building blocks; an example of Human made wetland

The photograph above shows an example of Human made wetland. This is a situation whereby soil is normally excavated to mould blocks for building; the effects of digging soil for such purposes negatively impacts the environment despite the fact that the soil excavated is actually meant for a good purpose. It is important identify locations – behind the buildings for safety reasons.

It is important however to refill back the soil in order to avoid:

- increasing soil erosion as those places easily get washed away by running water;
- breeding areas for mosquitoes during the rains;
- creating pits that are unsafe at night or during the day especially to children

In conclusion, the use of vegetation (trees) for energy and livelihoods can have both positive and negative impacts on the environment; for example, burning biomass/trees may result in more or less air pollution; the process of burning vegetation /trees substances releases carbon dioxide, a greenhouse gas, but when the plants/trees are planted and well taken care of, nearly an equivalent amount of carbon dioxide is captured by those plants through photosynthesis. It is therefore important to mitigate climate change by sustainable cultivation and that planting more trees can result in a net decrease of carbon dioxide emissions and at the same improve access to energy and livelihoods.

*Farmland management practices – for Self reliance*

The main objective of this section is to identify the ongoing Farmland management practices and design how to promote potential livelihoods to ensure sustainable livelihoods.

Sustainable agriculture is consisting of environmental friendly methods of farming practices that allow the production of crops or livestock without causing any damage to human or natural systems. It is specifically, helping towards preventing soil, water and the general biodiversity.

Sustainable agriculture means passing on, to another generation, a conserved or improved natural resource instead of having one which has been depleted or polluted.

Sustainable agriculture also can involve systems and practices of integrating perennials trees with crops and/or animals (agro forestry) on the same land management unit; such trees include but not limited to: Caliandra tree species; Sesbania Sesban; Sesbania grandiflora; leuceana lasopholia; Gravella robusta; Benjamina ficus; and Terminelia browni.

In sustainable agriculture, crop residues are usually used to feed the animals and the excreta from animals are used as nutrients for the crops vice -versa. Tree planting at households, institutions like schools and those planted at the green belts.

The trees planted in agro forestry system are also nitrogen fixing species as those listed above, there are also fruit trees such as oranges, mangoes, avocadoes, guavas and jackfruits and medicinal species like moringa and neem tree species that can also be incorporated in the system etc.

There are some of the following practices ongoing while others are new to consider: key messages and practices that will help enhance sustainable farming activities:

*a) Mixed Farming provides farmers with:*

- an opportunity to diversify risk from single-crop production;
- to use labour more efficiently;
- to have a source of cash for purchasing farm inputs; (d) to add value to crop or crop by-product;
- Combining crops and livestock.

*b) Multiple cropping: The process of growing two or more crops in the same piece of land, during the same season is called Multiple Cropping. It can be:*

- Double cropping (the practice where the second crop is planted after the first has been harvested);
- Relay cropping (the practice where a second crop is started along with the first one, before it is harvested).

*c) Rotation: The process of growing two or more dissimilar or unrelated crops in the same piece of land in different seasons is known as Crop Rotation. This process could be adopted as it comes with a series of benefits like:*

- avoid the build-up of pests that often occur when one particular specie of crop is continuously planted/ cultivated in one plot.
- the traditional element of crop rotation is the replenishment of nitrogen through the use of green manure in sequence with cereals and other crops
- Crop rotation can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants;

*The following are the different types of Livelihood systems observed in the settlement*

The livelihoods comprise activities and process that involves own means and production for crops and livestock; trade and exchange; remittances and collections/ gathering of other resources in the field.

| *a) Farm production – crops & livestock* | *b) Trade and exchange* | *c) Causal Labour & Gathering* |
|---|---|---|
| • Maize; Sorghum; Finger millet<br>• Banana; Irish potatoes<br>• Beans, Groundnuts; Green grammes<br>• Cassava and sweet potatoes;<br>• Vegetables: onions; tomatoes; cabbages; and fruits: guava, mangoes; oranges; etc<br>• Fish farming, food stores | • Groceries shops<br>• Vendors<br>• Barter trade<br>• Tailoring,<br>• Telephone repair<br>• Sandal making<br>• ICT skills | • Daily wages<br>• Share cropping<br>• Remittances |

Tree planting at household, institutions and public areas

| Period | Trees planted | h/h reached |
|---|---|---|
| 2009 | 2,148 | 512 |
| 2010 | 9,512 | 1,035 |
| 2011 | 154,269 (109.000 for lake protection) | 9,012 |
| 2012 | 66,155 | 2,193 |
| Total | 232,084 | 12,752 |
| Source: Nsamisi Jan; 2013 | | |

The households are normally given an average of 1-2 seedlings. There are some isolated cases of those with sufficient land that get more seedlings to plant. Considerable households said that they need more seedlings to plant but lack sufficient seedlings available. The plan in the budget is to target about 2000 households with at least 4 seedlings per household. The challenge is the need to ensure that the IPs raise seedlings so as to increase to at least 10 seedlings per household.

In the photograph below see some trees planted at the household level. The survival rate of those trees planted at the households' level was better (about 70%) than those planted in the public places was 20-30% survival rate.

There is regular care and watering at household level is more likely than watering trees planted in the public places, unless roles and responsibilities are not well structured and operational; sense of ownership at household level than trees public place is likely higher that of the public places; and the perimeter fence in compounds also helps to enhance protecting trees from animals.

Figure 4 Trees Planted at Household level in Nakivale

Figure 5 Photo of trees survived Termites' attack while where the crowd is trees were destroyed by Termites

The termites was not only a problem at the woodlot and but was also a problem at household level. The attack by the termites has considerable impact on the survival rate of the trees planted in the settlement.

- It is important to apply pesticides /chemicals in the holes/soil before planting and if not applied at the time of planting, apply it at the base of the tree planted in order to control the pests.

- It would also be good to raise awareness on the use of organic and traditional products such as Ash ( a handful per plant) or formulations of Neem tree mixed (ration 3:1) with some small quantities of washing – detergent to make it stick and increase the spreading effect and apply this on the leaves or on the bark of the plants /trees to control termites;

- The Implementing Partners (IPs) staff need induct the refugees and the nationals on these practices; it is also important to collaborate with the forestry department for further technical support and policy guidance.

*Alternative livelihoods in the settlement*

Figure 6 Maize grains : Figure 7 Sorghum grains : Figure 8 Beans : Figure 9 Vegetables

Households are able to produce, vegetables, legumes for household use and surplus they market locally. In a discussion with one of the households in Jur Community noted was provided 5 kgs of sorghum seed to plant and produced about 270 kgs of sorghum grain, this is quite a substantial amount of grain that can supplement household's food needs. There are also quite a number livelihoods activities going on in the settlement that can quickly impact on the food and income needs and help minimize high dependency on forestry resources to get income as well as need for full rations in the settlement, funds permitting, to promote them more extensively, these are a few examples:

- Goats/sheep
- Chicken,
- Ducks
- Pigs
- Bee keeping
- Grain marketing

In the process of promoting and scaling up these activities, it is necessary to provide households /beneficiaries with the necessary basic knowledge and skills through training and hands-on on the principles and practices of Small stock management i.e. feeding, shelter, disease control etc. The photograph below shows Small stock promotion, an example of a success story in Nakivale; in which 10 groups each receives 25 goats in the settlement (see other details below).

10 groups with at least 10-15 members each; each group received 10 female goats and one male/buck; after the first off -springs the kids are given a vulnerable member identified by the community; one goat can produce /kid after every four months – three times per year, with average 3 kids in each kidding; so in each group it is expected that 10 by the end of the year will produce total roughly 90 kids; goat with good management have got high multiplier effect; goats feed is very basic and watering; they can be fed leaves of agro-forestry trees such Luciana lasopholia, caliandra, sesbania grandiflora.

*Pig farming opportunity (another example)*

There is potential of Piggery farming in the settlement. It can be really a profitable enterprise that can make a huge impact as an alternative source of livelihood in the settlement, if more support can be dedicated towards it; at the moment there is no support focusing on this activity. The growth rate of pigs is particularly very fast and high, it can gain/grow 300grams daily with good conversion rate of the food to meat is very high if properly fed with green fodder, kitchen & farm wastes pigs can gain 15 to 18 kilos in a month. The pregnancy period for pigs is normally 114days (i.e. 3months+3weeks+3days), which is a very short period of time and therefore can provide quick returns.

**Figure 10 One Female pig with 12 piglets; experience of Ramwanja settlement**

One can get delivery of piglets twice in a year or five times in two years. In each delivery one female pig will give 8 to 12 piglets. In eight months it will reach 100 to 120kgs which is all depending upon the nutrition and feeding management of the pigs. It is therefore important to promote piggery farming across the settlement at least having 2-4 households in each of the 4 clusters in the settlement as demonstrations where other households can learn.

It will be useful to conduct exchange visits within the camp, there are some pigs kept by individuals to share experience and learn from; conduct exchange programme visit to other settlements like Ramwanja etc; ensure extension services to those who have been given new young pigs /piglets.; ensure vaccinations and treatment against diseases and parasites; conduct field days in successful locations to share best practices; scale- up the projects to cover more households.

*Waste management Vs energy practices*

This section aims to identify existing Waste management practices and ways by which the same can be recycled into energy by households themselves.

The Waste management is a process of the collection, transport, processing or disposal, managing and monitoring of waste materials.

The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment.

The waste material can also be called rubbish, trash, refuse or garbage etc. The following are some of the consequences of waste if the material is disposed of properly:

- It attracts rodents and insects, which harbour parasites and germs that can cause health problems in communities and settlements.
- Exposure to hazardous wastes, particularly when they are burned, can cause various other diseases including cancers and respiratory diseases.
- Waste can contaminate surface water, groundwater, soil, and air which cause more problems for humans, other species, and ecosystems.
- Waste treatment and disposal produces significant green house gas (GHG) emissions, notably methane, which is contributing significantly to global climate.
- Hierarchy of methods of waste management in the order of the most to least preferred method of disposing waste material:

a) Re-use of waste material
b) Recycling of waste material
c) Burning of waste material
d) Burying of waste material

a) Re-use of waste material

The waste material can be used again after it has been used, it can be reused for the same or different purpose. It actually involves taking a useful material and exchanging it without reprocessing it like in recycling, reuse helps to save time, money, energy, and resources. For example, plastic containers /bags can be reused instead of throwing them away and buying new ones.

b) Recycling of waste material:

The process of waste disposal involves Resource recovery, which is the selective extraction of disposed materials for a specific next use, such as recycling, composting or energy generation. The aim of the resource recovery is to extract the maximum practical benefits from products, delay the consumption of original natural resources, and to generate the minimum amount of waste.

The recycling of materials therefore involves the collection and reuse of waste materials such as empty tins or containers. The waste material is processed again into a new product or item. The waste material for recycling purposes may be collected separately from general waste using specific waste bins. The following are some of the farm and household wastes available in the settlement that can be recycled for compost manure and/or for energy; for example, recycling of paper as that of "Makapad" production (see some photos of some example later in this section).

:

- Maize cobs
- Sorghum husks
- Finger millet husks
- Banana pearls
- Irish potatoes pearls
- Beans husks
- Cassava peels
- Groundnut husks
- Any farm produce wastes
- Any kitchen waste
- But not plastics.

c) Burning of waste material

This method involves burning of waste material as a way of waste disposal. The solid organic wastes burnt to convert them into residue and gaseous products. This method is useful for disposal of residues of both solid waste management and solid residue from waste water management process. This process reduces the volumes of solid waste up to 20 to 30 percent of the original volume. It converts waste materials into heat, gas, steam and ash. It can be carried out both on a small scale by individuals and on a large scale by the industries.

It is used to dispose of solid, liquid and gaseous waste. It is recognized as a practical method of disposing of certain hazardous waste materials such as medical waste though there are issues of gaseous substances discharged to the environment. For example, waste materials are burnt before using a machine compress and compact in the required density for briquettes (Nsamisi).

d) Burying of waste material:

This method involves burying the waste as method of disposal. It remains the most common method of waste disposal in many places. Like use of abandoned or unused quarries for example to burry dump the waste. If the site is properly designed and managed it can be a hygienic and relatively inexpensive method of disposing of waste materials. If not, can create a number of adverse environmental impacts such as wind-blown litter and attract rodents as well as vermin. There is also the problem of gaseous substances produced like Co2 and methane; however, it still remains the most common practice of waste disposal.

During the mission to Nakivale, it was observed that the numbers of garbage collection pits were inadequate and particularly in and around the market place and other public amenities such as water points etc. The Implementing Partners (IPs) needs to increase awareness raising during mobilization campaigns in the settlement – construction and use of latrines, rubbish pits, water filters and drying racks etc. The following need to observe in waste management process:

- taking cans, glass, plastics, fishing line and non-biodegradable wastes ashore
- not discarding pollutants in water drains etc
- reducing use of chemicals, fertilisers and pesticides
- Re-use and recycling of paper e.g. as seen in "Makapad" production.

Figure 11 The Waste pit should be at least 60 cm deep.

- The type of a mixture of the waste materials in the above photograph of the waste pit is more preferable for making compost manure than use for making charcoal briquettes. The specifications of waste pits vary according the amount of waste anticipated, but then at least be 60 cm depth, will allow the material to decompose/rot well and not blown by wind all over as was observed in a number of instances in the during a Transec-walk in Nakivale settlement.

- The material for making briquettes like those waste materials listed for example in the above section b) recycling: need to be sorted out and kept separately for recycling to make the materials more suitable for making briquettes, mix different materials only when it does not make it difficult to process briquettes.

- The picture below illustrates a process of waste management or disposal, in that, it would be good to prevent by avoiding using it completely – i.e. we can prevent plastic carrier bags from going to a landfill by using long- life bags such as canvas bags – that will last forever.

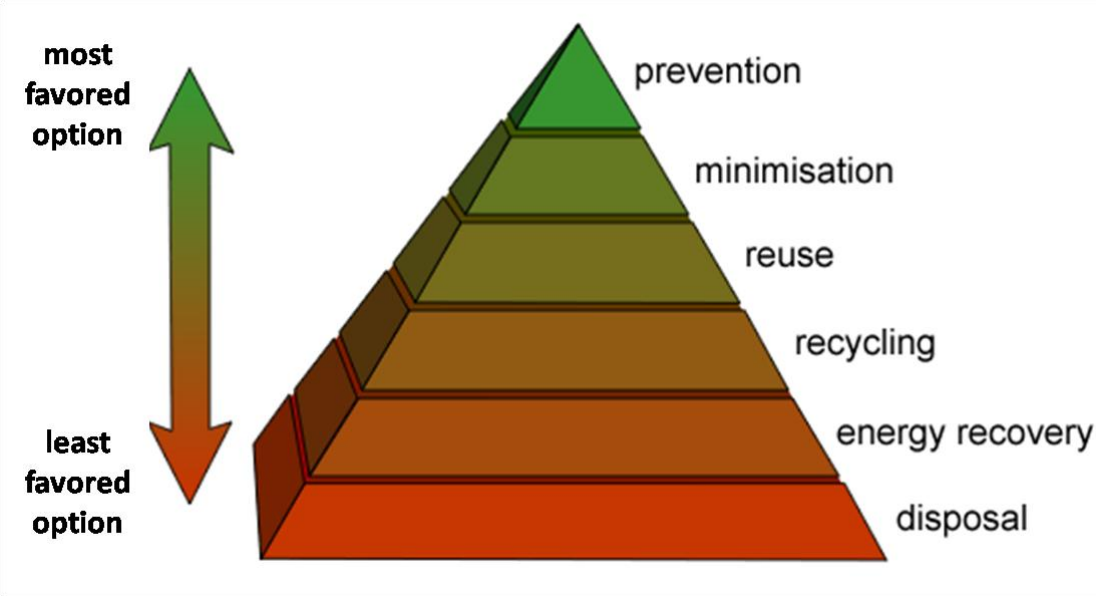



Figure 12A sample of Pit latrine, kept clean in Nakivale

*Alternative Sources of Energy –*

The domestic energy consumption is actually the amount of energy that households spend on the different appliances and the equipment used within households. The amount of energy used per household varies widely with the standards of living of different households, the age and type of residence. The refugees are settled in the community and as such their main source of energy for cooking purposes is firewood.

There are some ongoing trials of energy saving stoves such as Rocket Lorena and SAVE 80 cooking stove, the latter was a donation of a Japanese company. A set comprises cooking stove and serving pots systems.

**Figure 13 SAVE 80 Stove**

About 1,080 SAVE 80 Stoves were distributed and these stoves are generally accepted by communities. It is important to cut firewood into small pieces of wood to make use of SAVE 80 stove more effective. It was noted that households lack axes for cutting firewood into small pieces to improve efficient use of firewood, which need to be addressed funds permitting. There is need for staff to ffollow-up to assess the performance/adoption rates of mud stoves and challenges households face with about 3,874stoves/ Rocket Lorena distributed since 2009 and those 1,080 SAVE 80 Stoves donated by a Japanese company, some of which refugees reportedly sold to the nationals.

| period | Mud stove coverage | Mud charcoal/ Waste charcoal | Location |
|---|---|---|---|
| 2009 | 423 | 0 | JURU |
| 2010 | 918 | 312 | JURU, |
| 2011 | 1335 | 654 | JURU,RUBONDO,BASE CAMP |
| 2012 | 1,198 | 346 | JURU, RUBONDO. |
| **Total** | **3,874** | **1,312** | |
| Source: Nsamizi 16th January 2013 | | | |

The total coverage for Mud stoves since 2009 is 3,874stoves and Mud charcoal /Waste charcoal:

The briquette production is viable due to sufficient farm produce wastes and household waste materials available in the settlement. It is possible to either use manual or machinery to compress and compact the waste materials into charcoal briquettes for households fuel. The material should have below 10% moisture content and local drying is sufficient to achieve the level of moisture content. The size of the waste materials should be less than 20mm size if not it can be cut and pounded to size.


**Figure 14: Sample of Banana peels and Maize cobs that cab used for making briquette**

The following is list of some different types of waste materials observed available in the settlement, some of which, households are using to produce charcoal briquette; there are some households using maize cobs directly as source of household fuel for cooking:

- Maize cobs
- Sorghum husks
- Finger millet husks
- Banana pearls
- Irish potatoes pearls
- Beans husks
- Cassava pearls
- Groundnut husks
- Any farm produce wastes
- Any kitchen waste
- But not plastics.


Figure 15: Sample of Charcoal Briquette that has been compressed by a machine in Nakivale.

The photograph above shows a picture of a sample of briquette and a rotary hand compressor. The machine has been located at Robondo centre and was brought to Juru Community Centre for training purposes. The type of the machine below costs 1.5 million Uganda Shillings. The

machine is used by 4 groups in the settlement on rotation basis to make charcoal briquettes to use for cooking.

The dry waste material is filled into a drum/container under airtight condition to burn. After, that the material cools down and it is fed into compressor to compact it and cut into small pieces about 10-15 cm for use.

It was reported that the briquette produced using a compressor can only be used twice as opposed the type of briquette in the picture below which is compacted manually that it can be used more than four times.

Figure 16: Charcoal briquette made manually used in the traditional Three Stoned fire -place and improved stove.

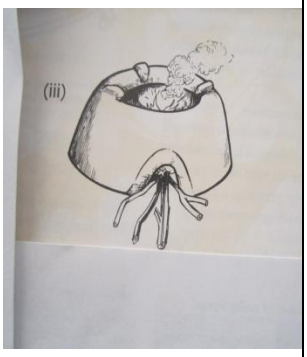
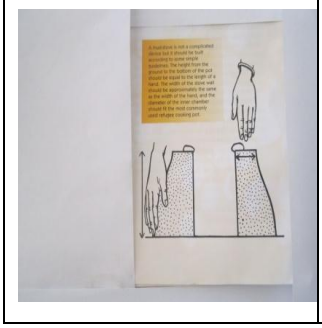
It was noted that one of the groups produced about 7,000 pieces of charcoal briquette and distributed to the members. The same waste materials listed above similarly are used to produce round balls type of charcoal briquettes by pounding manually. The briquettes can be used for cooking more than four times and last for 4 months before its quality goes down.

There is a small piece of firewood is actually used to light the balls at the beginning and once the balls get lit will continue burning at one's own cooking time are removed.

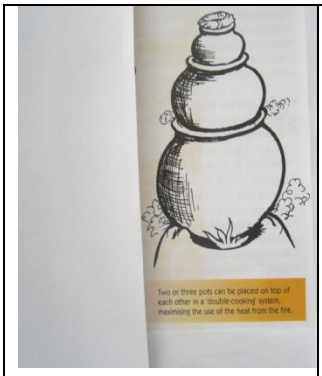
## Annex 1

| Using improved stoves need to be combined with improved practices that help save energy during cooking for different foods, in different environments and cultural settings[1]: | |
|---|---|
| **Improved Traditional Coking Stoves** | There are many forms of Improved cooking stoves, that are more efficient than open fire cooking places:<br>• Because the flow of air and hot gases from the fuel is better directed to concentrate heat on the pot; |

[1] Source: UNHCR Domestic Energy Handbook

| | |
|---|---|
| | • Because the fireplace of Improved Cooking Stove is normally insulated to prevent heat loss by radiation.<br>• This actually ensures efficiency of at least 20% of most Improved Stoves, which is saving about 25% of energy. |
| **Specific Stove designs**<br>  <br> | Different types of improved stoves have been developed to suit different cooking traditions:<br>• a) those that users can build for themselves which are often called Mud-stoves because of the kind of material typically used to make them.<br>• b) there are also those fabricated types of stoves assembled by specialized producers using metal, fired clay or a combination of the two.<br>• The most basic improvement to the open traditional fire cooking place is, filling in two sides of the three stones with mud or clay wall to prevent wind.<br>• Other types of mud-stoves include built up side walls, a sunken fire chamber, resting place for integrated pot and doorway for fuel.<br>• One to two- pot mud-stove best suits the refugee setting and can save energy by about 20%.<br>• Mud stoves are made with a combination of clay/or any type of clayey soil if pure clay soil is not available, sand, and straw/grass.<br>• Termite hills are a good source of soil for making mud-cooking stoves<br>• Sand is used to improve stove's resistance to heat – so that heat does not get through fast.<br>• Dry straw or grass also allows the stove to expand and contract without cracking as it gets hot and cools down at the same time. |
| **Mud-stove mixtures** | • There is no standard formula to use when building mud-stoves;<br>• And experimentation is acceptable but one needs to ensure they are durable with minimal cracking.<br>• Some examples: In Mwanza Tanzania; they are using 1 part sand; 2 parts clay. In Morogoro: 3 parts clay soil; 1 part pounded grass and small amount of cow dung and ash. In Uganda: the 2-pot loreno stove; 3 parts sand, 1 part clay. While single pot in Hoima stove use 3 parts sand: 3 parts clay: 1 part cow-dung: and 1 part ash. |
| **Mixing ratios** | • Ratios will vary from place to place.<br>• If the stove building is not holding together properly, it is likely that more clay is needed<br>• If stoves are cracking excessively during drying before use it is more likely that more sand is needed.<br>• If stoves are cracking during cooking, it is likely that cow dung and grass is needed to make stove more resistant.<br>• Promotion of innovation is encouraged as users will feel more comfortable<br>• Users will then be familiar with the stove and more likely to maintain the stoves. |
| **Basic design principles**<br>  | • Distance from the ground to the base of cooking pot should be about 20cm, equal to the length of hand from the wrist to the finger tips, to give enough space for firewood to burn properly.<br>• The walls of the stove should be as wide as a hand laid flat on the ground to get the best balance between insulating properties and the ability to heat up the pot quickly.<br>• The stove's internal diameter should be made to fit the family's normal cooking pot so that it fits closely so that heat loss around the sides is minimized.<br>• Mud stove producers should be given flexibility, apart from these basic guidelines, to innovate and adapt the ways of making the stove as they wish. |

| | |
|---|---|
| **Costs** | • There is actually no cost; will require constant repair; can be replaced with fabricated stoves /fired clay stoves; |
| **Firewood preparation-facts** | • Cut and split firewood sticks with diameter 3-5 cm; 30 -60 cm in length<br>• Use dry firewood high moisture content slows down burning process<br>• Wood which is air dried for two months has about twice the heat value and saves up to 20-25% energy |
| **Fire management** | • Shield the fire from wind by using local materials like stone/rocks, mud, or pieces of firewood that are still in the process of drying.<br>• The next stage of fuel economy is to use mud-stoves in an enclosed fireplace (as stated above)<br>• Control the air supply during initial the lighting stage as burning needs much oxygen so fireplace needs to be well ventilated; thereafter the burning process needs less oxygen once a full burning is achieved<br>• Regulated fire uses less wood, burns completely and gives off heat at a constant rate.<br>• Once food in a covered pot has boiled it is not necessary to add more fuel, because the heat retained in the fireplace, stove and pot is transferred to food; fuel can be removed to save energy (Simmering food cooks just as quickly as rapid boiling ; it also ensures retention of more of nutritional value).<br>• Put out fire promptly once cooking is complete, this can amount to saving about 15-20% of energy<br>• Ensure families have sufficient clothing and blankets to keep them warm to avoid having to keep fire burning for long periods in the night and during cold weather. |
| **Diet and food preparation** | • Promote fresh food, it cooks more rapidly than dried food<br>• Fresh beans, for example, can usually cook in a matter of 30-40 minutes while dried ones of several seasons old need up to 10 hours to cook well.<br>• Pre-soaking hard food for 5-8 hours can result in fuel savings up to 40% i.e. beans<br>• Reason for resistance to pre-soaking is due to loss in flavor, texture and colour<br>• Wash food first before pre-soaking in fresh water, which is also used for cooking so as to retain the nutrients.<br>• Boiling time of presoaked food is also reduced, which also helps to preserve nutrients<br>• Mill or pound hard grains and beans, loss of nutrients is likely in milling due to lack of control of a centralized milling service than in pounding, which an individual can control<br>• Cut hard food into small pieces to cook faster, meat, vegetables and potatoes, for example, should be cut in small pieces; this can save 20-30% of energy.<br>• The cooking time for some foods can be reduced by adding traditional tenderizers e.g. rock salt, or bicarbonate of soda for green vegetables, papaya juice for meat or water filtered through ash for beans. Identify and use traditional tenderizes, some of these are already known by different cultures. |
| **Cooking management** | • Build a cooking shelter out of poles and earth walls, thatch as maybe available to protect the fireplace<br>• Use the right pot, metal pots heat up quickly but retain little heat<br>• Fired clay pots retain heat over a long period of time<br>• Metal pots can be used for boiling water and preparing fast food such as rice, potatoes etc.<br>• Clay pots are good for foods that require boiling longer like maize and beans. |

| | |
|---|---|
|   | • Use tight – fitting lids, with weight on top<br>• Food should always be covered when cooking to reduce loss of energy<br>• A tight lid can save up to 20% of fuel<br>• Lids can be improvised like can use plates, woven pads of banana leaves,<br>• **Try double cooking while one pot is on the fire a second one can be placed on top to start warming water- sample photo.** The second pot on top acts as a lid; two or three pots can be placed on top of each other in a double cooking system<br>• Use only sufficient water to cover the food when cooking instead of putting much and later on removing. Continue to add small amounts of water as required till cooking is complete.<br>• Multi-family cooking though not very popular but can be tried if possible. |
| **A 'haybasket'** | • Transfer food to a 'haybasket' or fireless cooker after food has been cooked partly where it continues to cook without additional heat. This can be made out of local materials like a basket fitted with pillow of cotton material etc |
| **Fired Clay - Improved Stoves** | • Future budgets need to consider providing fired clay stoves for piloting in the camp. |

## Annex 2 ToR for Uganda

### NRC Secondee for Technical Support in Environmental Management, UNHCR

### Terms of Reference

## I. General information

**Title:** Environmental Specialist

**Sector**: Environment Unit, Operational Solutions and Transition Section (OSTS)

**Location**: Three months- Based in Kampala, Uganda with field trips to selected refugee settlements

**Duration of the assignment**: Three months with possible extension

## II. Background

UNHCR plans to recruit an International UNV Livelihood/environment specialist based in Kampala to provide support to the country refugee operations. UNHCR has also identified a firm to carry-out a comprehensive livelihood survey.

Additionally UNHCR currently collaborated with IUCN and carried out an EIA in Ramwanja which is a new settlement. The conclusions of the EIA as well as the mitigation measures proposed there-in will need to be incorporated into a work plan for programme implementation.

Furthermore, UNHCR is interested to link with the proposed World Food Programme (WFP) and UN Women Refugee Commission Safe-Firewood survey planned for this year, to inform UNHCR programme decisions.

Livelihood and Environment activities in the settlements are implemented by UNHCR's implementing & operational Partners. There will thus be need to provide technical guidance to the relevant IPs/OPs in their on-going Environment-related interventions and in formulation of strategies and concrete plans to implement.

UNHCR therefore seeks an NRC secondee, a duly experienced Environmental Expert, to be based in Kampala, who can provide qualified and timely technical support and guidance on mainstreaming environmental concerns in the ongoing livelihoods programme in the settlements. The NRC secondment will assist UNHCR, specifically the Environment Unit, in mainstreaming environmental issues into refugee operations in Uganda.

## III. Purpose of the secondment: Environment Specialist

The proposed NRC secondee will be based in Kampala and will support UNHCR in providing technical guidance and assistance to the various field operations in mainstreaming environmental issues, development of short and medium term strategy, identifying alternative sources of domestic energy. S/he will play a coordination role within UNHCR's operation by supporting all issues related to environment, energy and self-reliance ensuring that UNHCR policies are in line with the global and national strategies in Uganda. The secondee's position in Kampala is expected to substantially strengthen HQ's OSTS/Environment Unit's ability to fulfill its role not only in mainstreaming environment into operations, but also assistance in documenting best practices and lessons learnt in sectoral activities, including capacity building for UNHCR and Implementing Partners' staff in the field. The secondee will also continue the process initiated to mainstream Climate Change Adaptation and Disaster Risk Reduction into refugee operation.

The secondee will be placed under the overall supervision of the Senior Environmental Coordinator at HQ and be directly supervised by the Senior Community Services Officer in the UNHCR Representation in Kampala.

## IV. Duties and Responsibilities

1. *Provide technical advice to support programme implementation, through development of a country-specific short and medium term strategy of environmental, and self-reliance projects administered by UNHCR in the settlements.*

2. *In consultation with the relevant stakeholders in government institutions, Implementing Partners, refugees and host communities, identify concrete activities and alternatives sources of energy to contribute towards mitigating impacts on environment in Nakivale, Kyaka II, and Kyangwali & Rwamwanja/Oruchinga.*

3. *Based on the EIA report of IUCN for Ramwanja, review and provide technical input on the mitigation measures recommended in order to mainstream environmental issues in the new settlement from the beginning.*

## V. Minimum Qualifications and Professional Experience

- Advanced university degree in Environmental Science, Renewable Energy, Agricultural Science, or Forestry
- Minimum 7-10 years of relevant working experience at professional level and minimum of 5 years in an international capacity, preferably in developing countries in field situations
- Experience working with UNHCR as well as in environmental management, domestic energy and community participation
- Awareness of and practical experience with refugee-related environmental problems
- Previous professional work with government and UN agencies
- Experience in environmental assessment, planning, monitoring and evaluation of integrated environmental programmes/projects in displacement and stable situations
- Familiarity with emerging environmentally sustainable and appropriate technologies, and renewable energy
- Familiarity with community-based and participatory approaches
- Highly developed writing, editorial and presentation skills

## VI. Desirable Qualifications and Competencies

- Project management skills
- Designing and facilitating training programmes
- Experience in working in environment both at Headquarters and country level
- Fluency in English (both written and spoken) is essential.
- Flexibility and adaptability, ability to work in a team, good communication skills, and professional and personal integrity

## VII. Training components and learning elements

**Training components:** Upon joining the Section, the incumbent will receive a thorough orientation on the overall support function of the Section to its field operations, sectoral activities and a general overview of UNHCR's roles and responsibilities towards the persons of concern to the Organisation. The Sector Specialist will guide her/him in day to day work in the Section. S/he will also be given training packages on the Environmental Management Training Programme, and the Operations Management Learning Programme as well as some sections of the Workshop on Emergency Management for self-study.

**Learning elements:** The incumbent will enhance his/her knowledge in key environmental related sectors which are the responsibilities of the Section. In addition, s/he will be able to understand the

overall programme planning and field operation issues of UNHCR. It is expected that the incumbent will be able to:

- Write technical assessment reports;
- Evaluate project proposals and guide field operations on technical issues;
- Learn UNHCR programme planning and project budget structures; and
- Integrate UNHCR policy priorities in the areas of environment, children, women, elderly, and gender in the formulation of UNHCR assistance/intervention activities.

## VIII. Background Information on OSTS

The Operational Solutions and Transition Section (OSTS) within the DPSM at UNHCR Headquarters, Geneva, groups together various key technical support activities covering shelter/physical planning/infrastructure, education, environmental management, self-reliance/livelihoods, peace building, local integration, reintegration, and partnership with development organizations. OSTS leads the inter-agency cluster for emergency shelter and represents UNHCR for education and early recovery clusters.